

Knowledge, Attitude and Practice Survey on Cementation Regimen of Fixed Dental Prosthesis Among Indian Dental Practitioners

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Abstract:

Background: Rehabilitation of missing teeth with fixed dental prosthesis has been practiced since many years. Fixed dental prosthesis are still preferred than removable dentures in most of the reliable cases due to strength, aesthetics, satisfactory retention and psychological comfort. The cements used for luting the crowns has a significant role in the success of fixed prosthesis. It is a challenging task in selecting the proper cements from the diverse range of materials available today.

Aim: The aim of the study is to evaluate the knowledge, attitude, and practice of cements/ luting agents used for fixed prosthesis among Indian dental practitioners.

Materials and Methods: The study involved a survey of 171 dental practitioners all among India. A questionnaire on the knowledge, attitude and practice of cementation regimen for fixed dental prosthesis among the dental practitioners was used to collect the data.

Results: The results of the survey suggest that dentists participated prefer to use different cementation regime depending on the restorative material.

Conclusion: No ideal cement exists to date. The list of cements is diverse, having their own merits and demerits. Older, tried and tested materials must not be ignored or pushed aside, yet the prudent clinician should diligently keep up with new technology. The choice of cement should not be arbitrary, nor should it necessarily be based on what the clinician uses for restorations, but should be considered in light of the fact that every restorative materials have different physical, chemical and esthetic properties based on which suitable surface treatment and use of luting agent / cement to be selected.

Keywords: dental cements, glass ionomer cements, Zirconia, lithium disilicate crowns, fixed dental prosthesis.

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I. Introduction:

In the recent years, a diverse variety of restorative materials are available on the market for the fabrication of indirect restorations, such as full coverage crowns or multi-unit fixed dental prostheses (FDPs), implant prosthesis¹. The materials used for fabrication ranges from cast alloys and porcelain-fused-to-metal (PFM) to all ceramics (leucite-reinforced glass, lithium-disilicate ceramics) and polycrystalline ceramics has a broad spectrum of mechanical and esthetic properties, which allows the implementation of different treatment regimens². Nowadays, tooth colored restorations are preferred much. Metal and porcelain fused metal prosthesis can be easily cemented with conventional luting agents like zinc-oxide phosphate or glass-ionomer cements or compomers without extensive pre-treatment. In contrast, fixed prosthesis fabricated from all ceramics or CAD/CAM resin composites requires pre treatment with abrasives or coupling agents for cementation. Based on the mechanical, optical and esthetic properties of the indirect restorations, a varied cementation protocols to be followed³. The dentist should have sufficient knowledge on appropriate cementation techniques for restorations fabricated from the chemically heterogeneous group of materials. Thus, the aim of the current survey was to identify the type of cements/ luting agents preferred by dentists in India for the cementation of single crowns, multi-unit fixed dental prostheses or implant prosthesis.

II. Materials And Methods:

A total of 171 dentists who are practicing in India were included in this study. A questionnaire containing 15 questions focused on the perceptions and experiences on various cements or luting agents used for cementation of fixed dental prosthesis were given to them. The data obtained was analysed to achieve the results.

QUESTIONNAIRE:

1. Type of work sector you are predominantly involved in
 - a. Hospital based
 - b. Private clinic
 - c. Academic institution
2. Years of clinical experience
 - a. <2years
 - b. 2-5 years
 - c. 5 years
3. Do you practice fixed dental prosthesis
 - a. Yes
 - b. No
4. Do you provide a minimum of one single unit or multiple unit fixed prosthesis per month?
 - a. Yes
 - b. No
5. Do you follow isolation protocol while cementation?
 - a. Yes
 - b. No
6. Method of isolation regimen followed by you for cementation
 - a. Cotton rolls
 - b. Rubber dam
 - c. Airway syringe
 - d. Suction tips
 - e. Retraction cords
7. Are you aware of various cements/ luting agents available till date?
 - a. Yes
 - b. No
8. Which cement do you prefer to use for provisionalization?
 - a. Zinc oxide eugenol cement
 - b. Non eugenol cement
 - c. Zinc phosphate cement
 - d. Others-----
9. Which cement do you prefer to use for single unit metal crown/ metal ceramic crown?
 - a. Glass ionomer cement (GIC)
 - b. Resin modified GIC (RMGIC)
 - c. Resin cement
 - d. Others-----
10. Which cement do you prefer to use for multiple unit metal crown/ metal ceramic crown ?
 - a. Glass ionomer cement (GIC)
 - b. Resin modified GIC (RMGIC)
 - c. Resin cement
 - d. Others-----
11. Which cement do you prefer to use for Lithium disilcate crowns (E-Max)?
 - a. Glass ionomer cement (GIC)
 - b. Light cure resin cement
 - c. Self cure resin cement
 - d. Dual cure resin cement
 - e. Others-----
12. Which cement do you prefer to use for Zirconia crowns ?
 - a. Glass ionomer cement (GIC)
 - b. Light cure resin cement
 - c. Self cure resin cement
 - d. Dual cure resin cement
 - e. Others-----
13. Which cement do you prefer to use for laminates?
 - a. Glass ionomer cement (GIC)
 - b. Light cure resin cement
 - c. Self cure resin cement
 - d. Dual cure resin cement

- e. Others-----
- 14. Which cement do you prefer to use for cement retained implant prosthesis?
 - a. Glass ionomer cement (GIC)
 - b. Resin cement
 - c. Zinc phosphate cement
 - d. Zinc oxide eugenol cement
 - e. Others-----
- 15. Which cement/ luting agent has longest clinical success rate according to you ?
 - a. Glass ionomer cement (GIC)
 - b. Resin cement
 - c. Zinc phosphate cement
 - d. Zinc oxide eugenol cement
 - e. Others-----

III. Results And Observation:

The present survey was completed by 171 dentists, in which 74.1% were post graduated and 25.9% were under graduated. 8.2% samples was neglected as they did not place one fixed prosthesis unit per month.

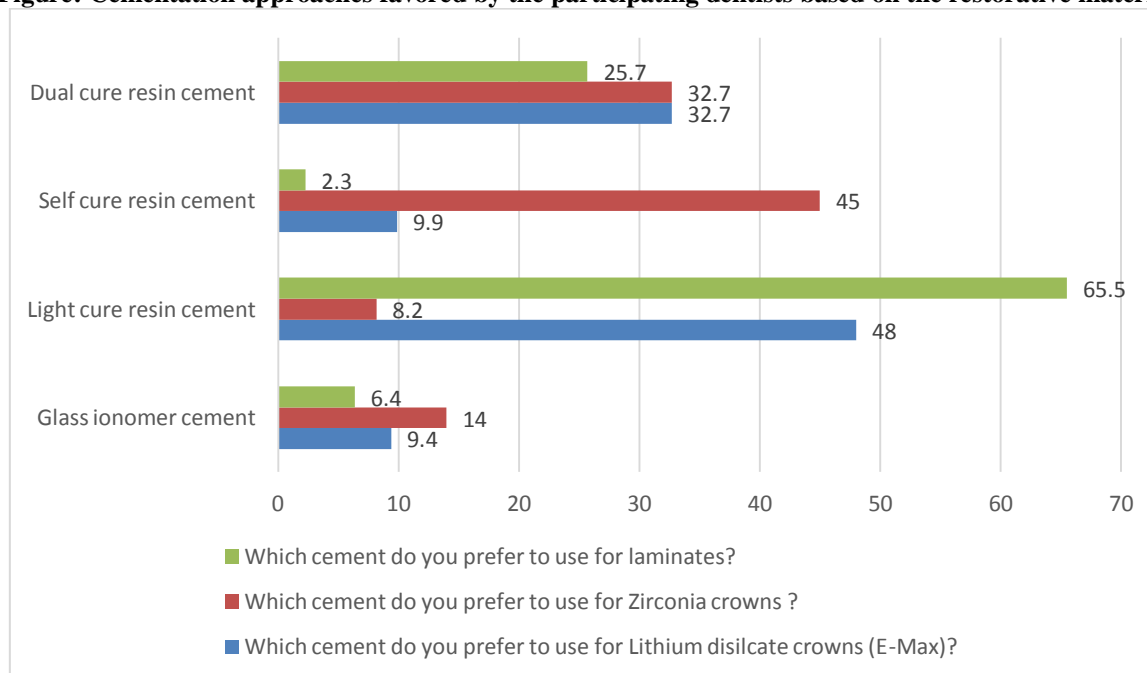
Descriptive statistics was performed using Frequency and percentage distribution. To find the association between the knowledge, attitude and practice of fixed dental prosthesis among the BDS and MDS qualification, chi square test was performed. To analyse the data SPSS (IBM SPSS Statistics for Windows, Version 26.0, Armonk, NY: IBM Corp. Released 2019) is used. Significance level is fixed as 5% ($\alpha = 0.05$). P-value <0.05 is considered to be statistically significant.

Table: Association among the BDS and MDS qualification on knowledge, attitude and practice on cementation regimen of fixed dental prosthesis among the Indian dental practitioners

S.No	QUESTIONNAIRE	OPTIONS	Study participants (n-171)		P-VALUE
			BDS	MDS	
			Frequency(n)	Frequency(n)	
1.	Are you aware of various cements/ luting agents available till date?	Yes	33	120	<0.01*
		No	12	6	
2.	Which cement do you prefer to use for provisionalization	Zinc oxide eugenol	22	50	0.515
		Non eugenol cement	19	65	
		Zinc phosphate	4	7	
		Other	0	4	
3.	Which cement do you prefer to use for single unit metal crown/ metal ceramic crown?	Glass ionomer cement	38	100	0.594
		Resin modified GIC	7	24	
		Resin cement	0	2	
		Others	0	0	
4.	Which cement do you prefer to use for multiple unit metal crown/ metal ceramic crown ?	Glass ionomer cement	22	71	0.268
		Resin modified GIC	23	51	
		Resin cement	0	4	
		Others	0	0	
5.	Which cement do you prefer to use for Lithium disilicate crowns (E-Max)?	Glass ionomer cement	6	10	0.001*
		Light cure resin cement	31	51	
		Self cure resin cement	4	13	
		Dual cure resin cement	4	52	
		Other	0	0	
6.	Which cement do you prefer to use for Zirconia crowns ?	Glass ionomer cement	8	16	0.001*
		Light cure resin cement	4	10	
		Self cure resin cement	29	48	

		Dual cure resin cement	4	52	
		Other	0	0	
7.	Which cement do you prefer to use for laminates?	Glass ionomer cement	4	7	0.020*
7.		Light cure resin cement	35	77	
		Self cure resin cement	2	2	
		Dual cure resin cement	4	40	
		Other	0	0	
8.	Which cement do you prefer to use for cement retained implant prosthesis?	Glass ionomer cement	12	53	0.01*
8.		Resin cement	0	32	
		Zinc phosphate cement	0	22	
		Zinc oxide eugenol cement	29	21	
		Other	0	0	
9.	Which cement/ luting agent has longest clinical success rate according to you ?	Glass ionomer cement	37	63	<0.01*
		Resin cement	7	55	
		Zinc phosphate cement	0	6	
		Zinc oxide eugenol cement	1	0	
		Other	0	2	

Figure: Cementation approaches favored by the participating dentists based on the restorative material



IV. Discussion:

The results of the current study suggests that most of the dentists who participated in the survey (91.8%) follow isolation protocols for the cementation whereas 82.4% use cotton rolls and 14.1% use suction tips for isolation. Isolation from body fluids like saliva, blood provides proper moisture control, good accessibility, visibility and workability. Such an environment is necessary for easy manipulation and insertion of restorative materials⁴. The question was about the cement used for provisionalisation for which 51.8% prefer non eugenol zinc oxide cement , 38.8% zinc oxide eugenol cement and 7.1% zinc phosphate cement.

Glass ionomer cement (GIC) is widely used for luting of prosthetic crowns due to its physicochemical bonding to tooth structures, low coefficients of thermal expansion, and long-term release of fluoride. Because of its low mechanical strength, GIC would not be a preferred cement for ceramic restorations which require support from the cement. This survey indicated that almost 80% of the participants followed

conventional cementation with glass-ionomer cement for the single unit metal ceramic restorations. Whereas for multiunit metal ceramic bridge only 51.8% use glass ionomer cement and remaining prefer resin modified glass ionomer cement.

Resin cement are composed of bisphenol-A-glycidyl methacrylate and other polymethacrylates. It has superior properties such as high bonding strength, high compressive strength, and low solubility. It is widely used as the choice of cement for ceramic restorations due to the disadvantages of other cement such as lack of solubility, support, and adhesion. It plays a significant role in the final clinical success of the treatment⁵.

While 50.6% of the participants favored light cure resin cement, 32.9% use dual cure resin cement and remaining use glass ionomer cement for lithium disilicate (Emax) crowns. Moreover, it should be considered that, for restorations fabricated from lithium disilicate glass ceramics, the appropriate cementation regimen can depend on the thickness and opacity of the individual restoration⁶. These glass based ceramics require proper surface treatment like etching to promote adhesion. Lithium-disilicate glass ceramic is often used to fabricate minimally invasive restorations. Most of the participants favored the use of resin cements for fixed prosthesis fabricated from lithium-disilicate glass ceramics^{7,8}. If the crown thickness is less than 2mm, light cure cements are preferred for better curing of cement. For the cementation of laminates, 64.8% preferred the use of light cure resin cement, 26.1% use dual cure resin cement, 6.8% use GIC and remaining use adhesive cement.

The bond strength of GIC and conventional composites was much lower, especially after aging by thermocycling. The combination of sandblasting and phosphate monomer 10 methacryloyloxydecyl dihydrogen phosphate (MDP) used for cementation using resin cements⁸. About 44.7% of the dentists here preferred self cure resin (adhesive) cement, 32.9% dual cure cement for the insertion of restorations fabricated from zirconia whereas the remaining dentists used conventional glass ionomer cement for cementation.

Various cements can be used for implant restorations like zinc phosphate, zinc oxide eugenol, glass ionomer cement or resin cement. Because of early strength and acceptable physical properties, zinc phosphate remains a good clinical choice as luting agent for implant prosthesis. Non eugenol Zinc oxide cement is better than eugenol for provisional cementation for implants due to low strength. Resin cements have the advantage of high compressive/tensile/bonding strength, low solubility, and esthetics⁵. Major disadvantage of resin cement in implant dentistry is difficulty in retrievability of the implant restoration. So chances of damage to crown and abutment may occur. In the survey, 37.5% use GIC, 30.7% use zinc oxide eugenol, 18.2% use resin cement, 12.5% use zinc phosphate cement for implant prosthesis. This survey implies that most of the participated dentists use proper cementation regime for different restorative materials.

V. Conclusion:

No ideal cement exists to date. The list of cements is diverse, having their own merits and demerits. Older, tried and tested materials must not be ignored or pushed aside, yet the prudent clinician should diligently keep up with new technology. The choice of cement should not be arbitrary, nor should it necessarily be based on what the clinician uses for restorations, but should be considered in light of the fact that every restorative materials have different physical, chemical and esthetic properties based on which suitable surface treatment and use of luting agent / cement to be selected.

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